



**OPERATING
SUMMARY**

PORT DOVER

water pollution control plant

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P676
1970
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Division of Plant Operations

**TD
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1970**

Port Dover : water pollution
control plant.
81855



Water management in Ontario

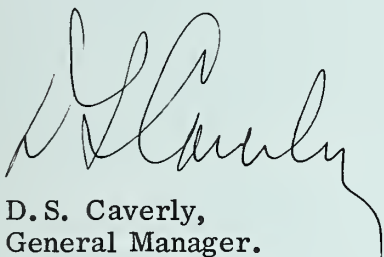
Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario


Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.



D.S. Caverly,
General Manager.



D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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PORT DOVER
water pollution control plant

operated for

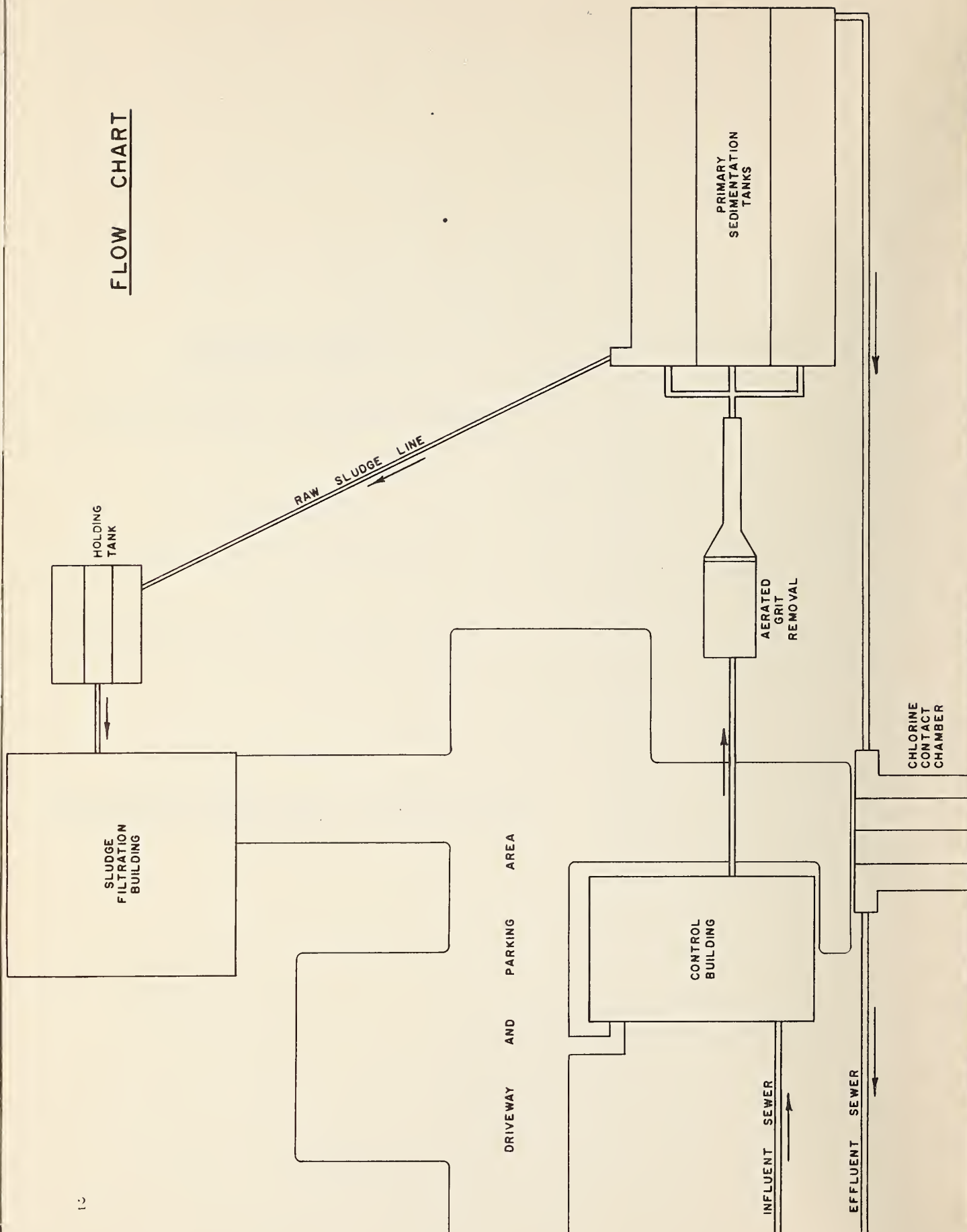
THE TOWN OF PORT DOVER

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY

FLOW CHART



DESIGN DATA

PROJECT NO.	2-0115-62	TREATMENT	Primary
DESIGN FLOW	2.1 mgd	DESIGN POPULATION	5,300
BOD - Raw Sewage	210 mg/l	SS - Raw Sewage	296 mg/l
- Removal	30%	- Removal	60%

RAW SEWAGE PUMPS

Type: Worthington
Size: One 800 gpm @ 24' tdh
One 500 gpm @ 24' tdh
Two 1750 gpm @ 25' tdh

PRIMARY TREATMENT

Grit Removal

Type: Aerated, mechanical grit collector (Rex Chainbelt)
Size: One 20' x 10' x 11.85' (14,750 gal)
Retention: 10 min

Air Supply

Type: Roots-Connersville
Size: Two 130 scfm

Primary Sedimentation

Type: Rex Chainbelt
Size: Three 75' x 15' x 8' (168,000 gal)
Retention: 1.93 hr
Loading: Surface, 620 gal/ft²/day
Weir, 46,500 gal/ft/day

CHLORINATION

- F & P automatic

Chlorine Contact Chamber

Size: One 21½' x 18' x 6½' (15,950 gal)
Retention: 11 min

OUTFALL

- to Lake Erie

SLUDGE HANDLING

Aerated holding tank, one,
20' x 15' x 8.2' (avg.)
Size: 2,460 ft³ or 12,750 gal

Vacuum Filter

Type: Eimco (cloth)
Size: One 200 sq ft

PUMPS -- TYPE AND SIZE

#1 Pumping Station (custom-built)

Type: Worthington
Size: Three 1750 gpm @ 66' tdh (station has one Barminutor, Model C)

#2 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 417 gpm @ 48' tdh

#3 Pumping Station (prefabricated)

Type: Fairbanks-Morse
Size: Two 207 gpm @ 65' tdh

#4 Pumping Station

Type: Flygt submersible
Size: Two 217 gpm @ 19' tdh

NOTE: Above pumping stations have overflows to Lynn River

'70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	.36	—	10.99	—
High	1.39	December	16.50	November
Low	.19	January	7.37	January

GENERAL

The Port Dover waterpollution control plant is a 2.10 mgd primary treatment plant consisting of screening facilities, an on-site pumping station, aerated grit removal, primary settling, chlorination, raw sludge storage and vacuum filtration. There are four remote pumping stations, two of which are prefabricated, one submersible and one custom-built. The latter has screens, barminution and chlorination facilities. The project is operated and maintained by a chief operator and an operator. During 1970 there were no major operating problems.

EXPENDITURES (1969 figures in brackets)

The total operating cost for the year was \$28,106.57 (\$27,326.42) or \$213.12 (\$208.42) per million gallons of sewage treated. The unit cost of treating one pound of BOD increased to 22 cents (12 cents).

PLANT FLOWS and CHLORINATION

The total flow treated in 1970 was 131.88 million gallons or 17% of design capacity.

Disinfection of the final effluent by chlorination is practised from April through October to avoid danger to public health from recreational use of the receiving water. The total 1970 consumption decreased slightly due to corresponding decreases in BOD loading.

PLANT EFFICIENCY

The average BOD and suspended solids concentrations at the influent were 164 milligrams per litre and 224 mg/l. Effluent BOD and suspended solids were 65 mg/l and 37 mg/l. The removal efficiencies for BOD and suspended solids were 60% and 84%, well above average for a primary plant.

The lower than normal BOD concentration in the influent can be attributed to two factors. The local cannery factory did not can peas and a local fish company improved their pretreatment.

Grit removal amounted to 2.74 cubic feet per million gallons, higher than last year but within the normal range for sanitary sewage.

VACUUM FILTRATION

Two methods of sludge vacuum filtration were used. Polyelectrolytes were used in filtering a total of 44.6 tons of dry solids, while lime and ferric chloride were used in filtering an additional 17.7 tons. The average yield of 6.0 pounds of dry sludge per square foot of filter area is considered normal for this operation. Chemical requirements of the sludge are lower than normal, with polyelectrolytes at 740 ppm, lime at 10.5% and ferric chloride at 2.2%. This beneficial effect can be attributed to industrial wastes.

The chemical cost using polyelectrolytes was \$3.49 per ton of dry solids compared with \$7.69 per ton of dry solids using lime and ferric chloride. However, polyelectrolytes are effective in treating sludge at this plant only during certain periods of the year.

CONCLUSIONS

During 1970, plant efficiency far exceeded design expectations for a primary treatment plant. However, the effluent did not meet the Ontario Water Resources Commission effluent objective of 15 mg/l for both BOD and suspended solids.

The use of polyelectrolytes for vacuum filtration of sludge, when possible, again produced a substantial unit cost reduction.

Discussions between the Town and the Ontario Water Resources Commission concerning changing the present municipal project to a Provincial project, as requested by the Town, are continuing.

PROJECT COSTS

NET CAPITAL COST (Final)	\$684, 451.08
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>463, 731.87</u>
Long Term Debt to OWRC	<u><u>\$220, 719.21</u></u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	\$ <u><u>36, 209.01</u></u>
Net Operating	\$ 28, 187.99
Debt Retirement	4, 454.00
Reserve	3, 571.63
Interest Charged	<u>12, 366.06</u>
TOTAL	\$ <u><u>48, 579.68</u></u>

RESERVE ACCOUNT

Balance @ January 1, 1970	\$ 27, 533.37
Deposited by Municipality	3, 571.63
Interest Earned	<u>1, 864.42</u>
	\$ 32, 969.42
Less Expenditures	<u>-</u>
Balance @ December 31, 1970	\$ <u><u>32, 969.42</u></u>

1970 OPERATING COSTS

• PAYROLL	60 %
• FUEL	%
• POWER	17 %
• CHEMICALS	6 %
• GENERAL SUPPLIES	7 %
• EQUIPMENT	2 %
• REPAIRS & MAINTENANCE	4 %
• SUNDRY	4 %
• WATER	%
• TRAVEL	< 1 %

TOTAL ANNUAL COST

NET OPERATING	58 %
DEBT RETIREMENT	9 %
INTEREST	26 %
RESERVE FUND	7 %

Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	127.71	\$23,641.32	\$185.12	10 cents
1967	114.26	22,671.63	198.42	21 cents
1968	122.53	23,368.29	190.71	12 cents
1969	133.42	27,326.42	208.42	12 cents
1970	131.88	28,106.57	213.12	22 cents

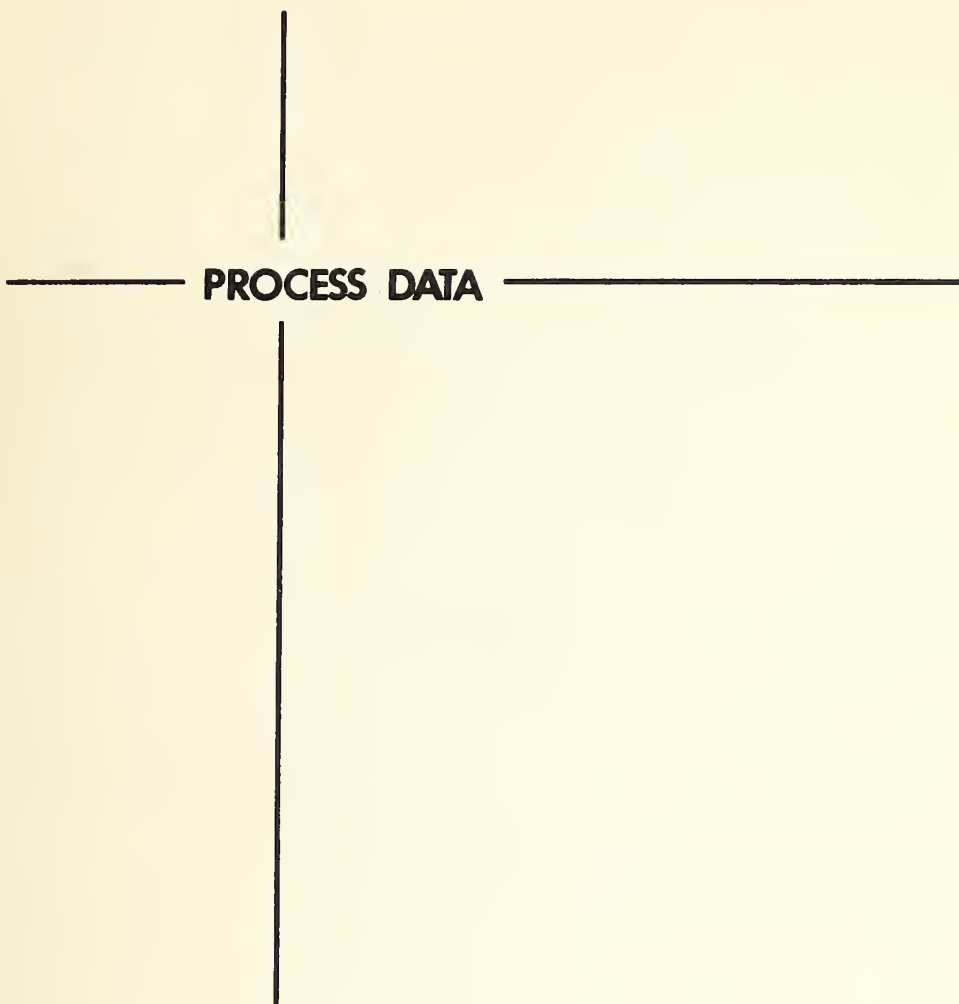
MONTHLY OPERATING COSTS

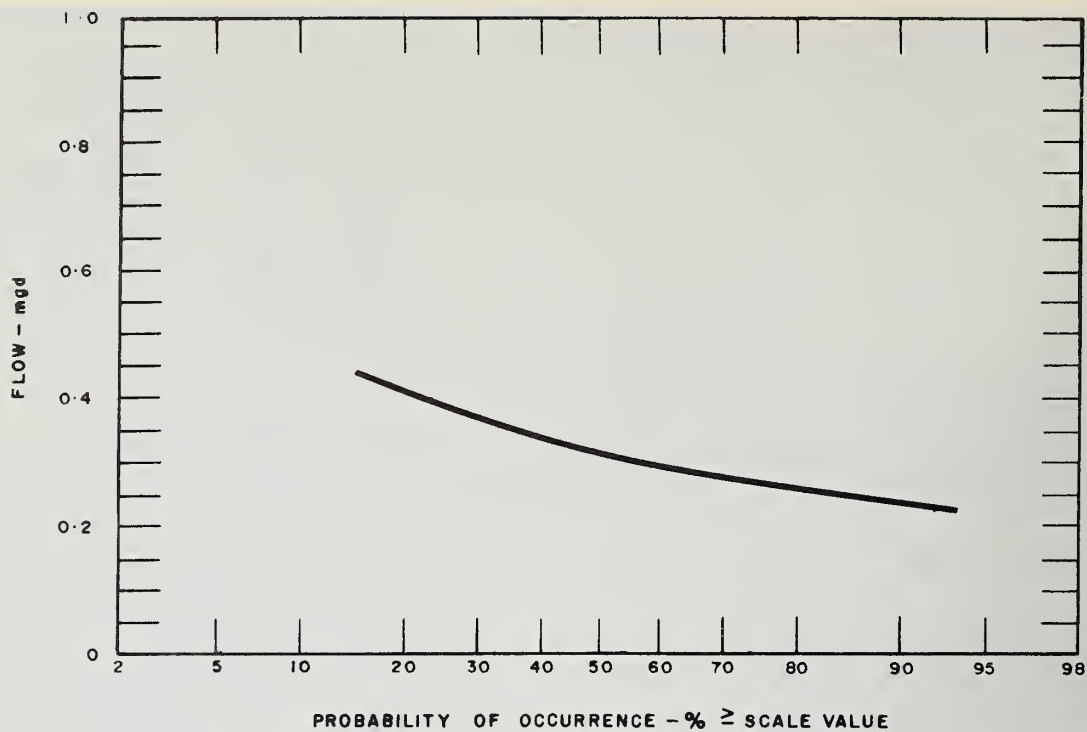
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	2093.45	1768.40	-	-	-	-	83.72	180.85	60.48	-	-	-
FEB	2124.03	1249.66	-	-	606.90	-	114.32	-	116.76	36.39	-	-
MAR	1965.99	1221.15	-	-	506.03	-	238.81	-	-	-	-	-
APR	1831.38	1221.50	-	-	369.04	-	193.34	-	-	35.95	-	11.55
MAY	2813.42	1389.56	-	-	477.27	815.06	54.58	-	76.95	-	-	-
JUNE	2065.03	1227.71	-	-	270.04	-	77.51	349.90	57.05	49.77	-	33.05
JULY	2355.13	1193.18	296.15	-	263.81	-	293.78	23.63	250.87	33.71	-	-
AUG	2708.83	1779.84	477.39	-	272.16	-	130.07	-	21.02	28.35	-	-
SEPT	2434.84	1201.60	-	-	282.11	-	140.88	-	-	810.25	-	-
OCT	2821.24	1218.14	-	-	310.23	675.85	310.62	-	290.54	15.86	-	-
NOV	2268.10	1282.30	-	-	347.17	280.64	314.93	-	-	43.06	-	-
DEC	2625.13	1184.70	-	-	1060.14	7.00	102.52	-	131.25	76.62	-	62.90
TOTAL	28106.57	15937.74	773.54	-	4764.90	1778.55	2055.08	554.38	1004.92	1129.96	-	107.50

BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE

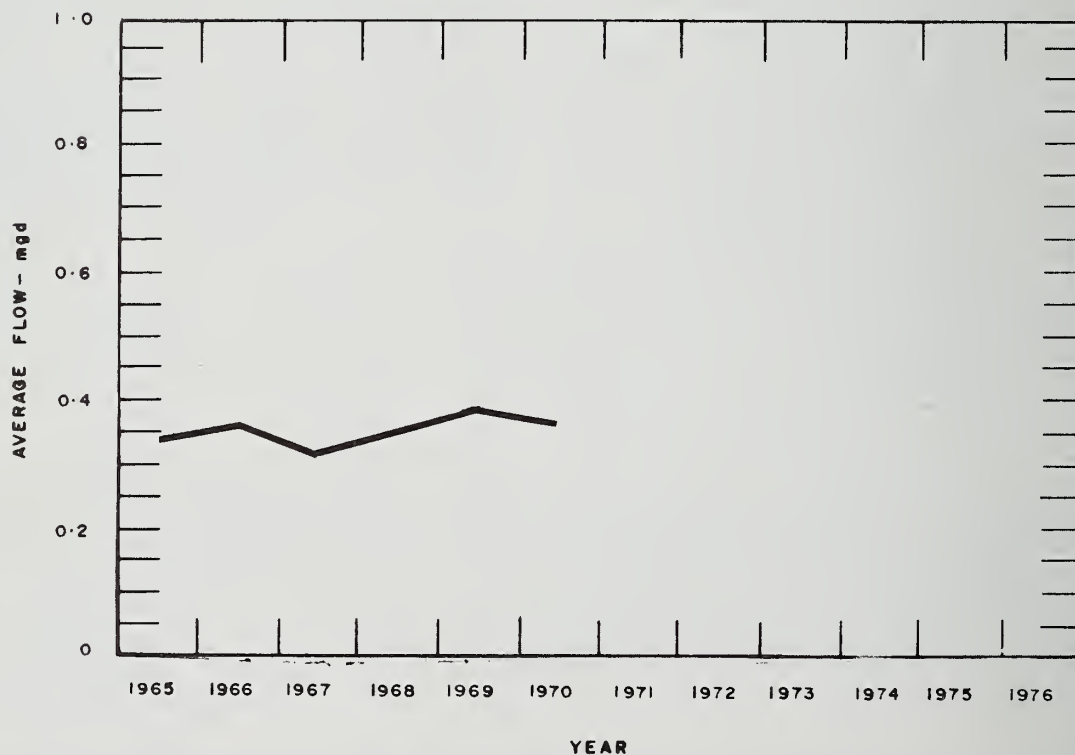
Note: Total does not include year-end adjustments.





FLAWS

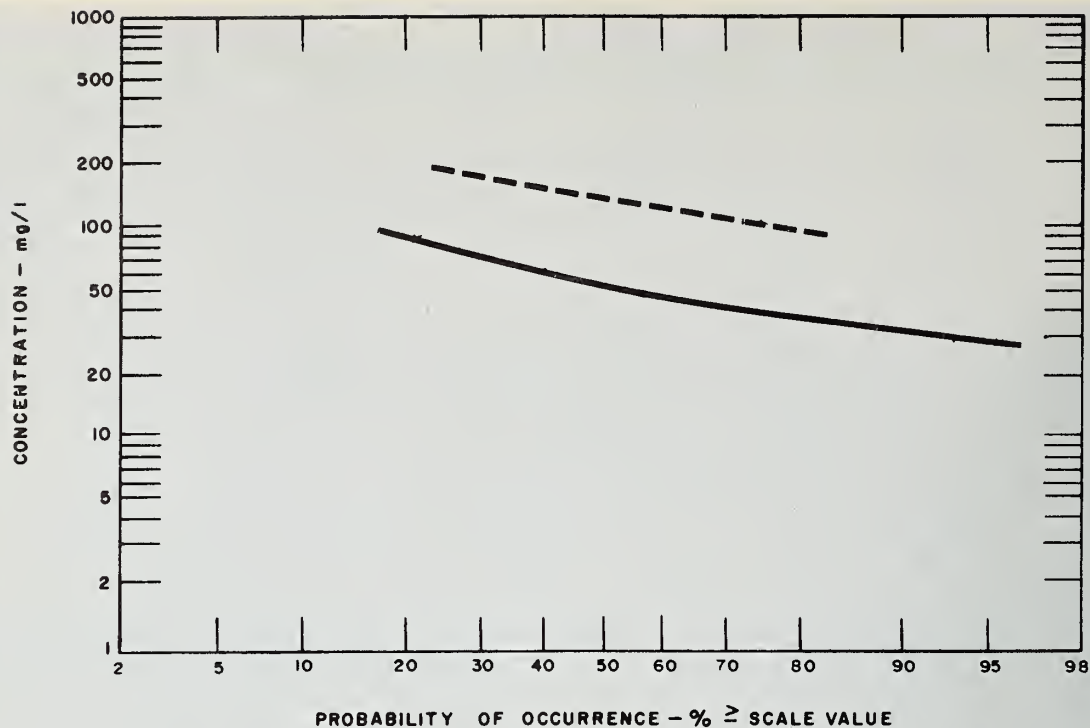
NOMINAL CAPACITY 2.1 M.G.D.



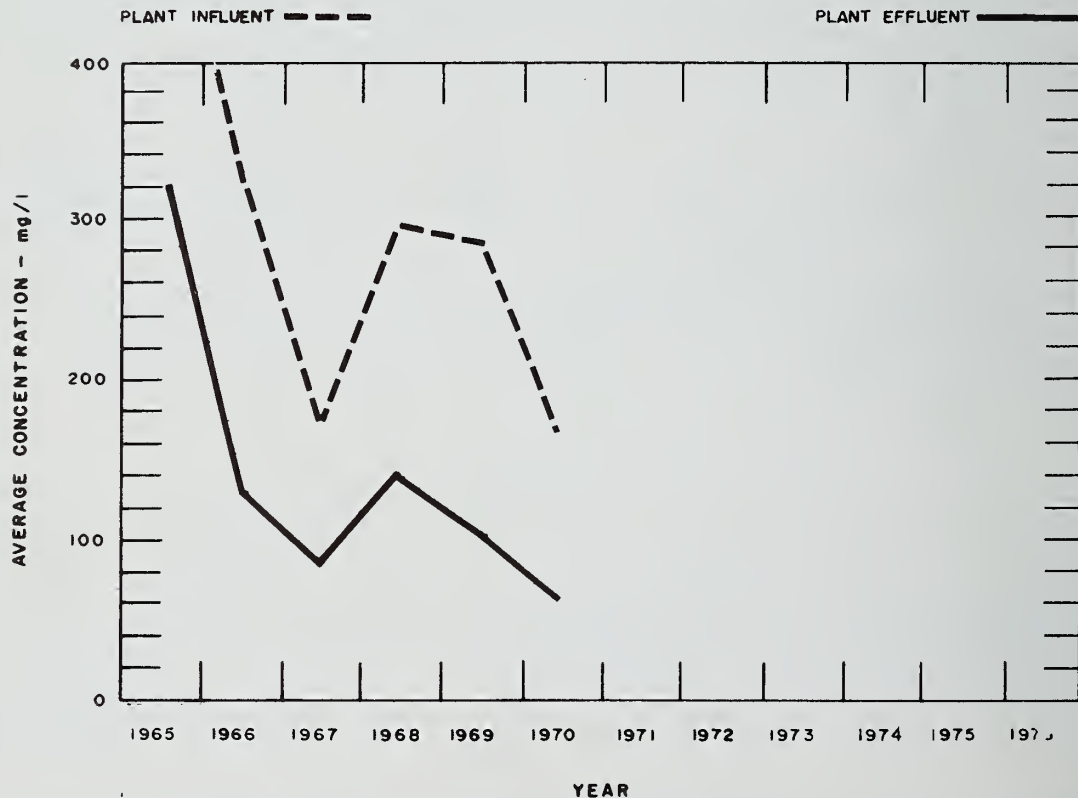
PLANT FLOWS and CHLORINATION

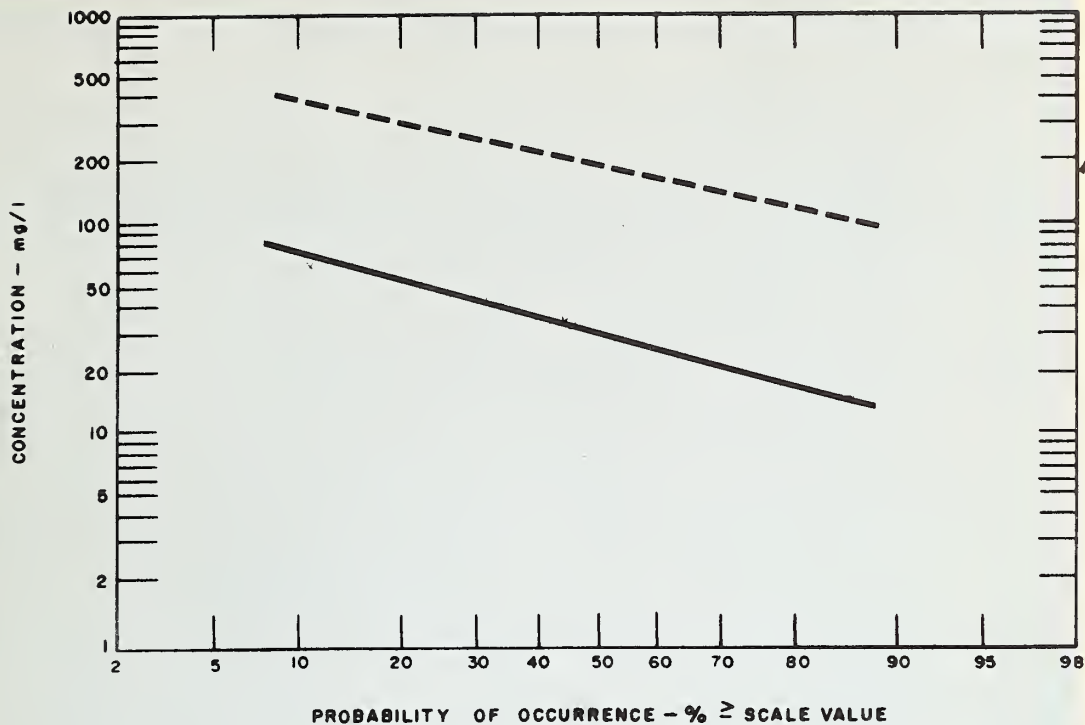
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE* mg/l
JAN	7.37	.24	.47	.19	0	0
FEB	8.67	.31	.77	.23	0	0
MAR	12.28	.40	1.15	.24	0	0
APR	13.13	.44	1.01	.31	975	7.6
MAY	8.95	.29	.38	.23	813	9.1
JUNE	8.10	.27	.34	.23	1044	12.9
JULY	10.00	.32	.51	.27	1195	12.0
AUG	8.89	.29	.37	.23	1281	14.4
SEPT	10.66	.31	.63	.25	1903	17.9
OCT	12.49	.40	.94	.27	1415	11.3
NOV	16.50	.55	1.18	.37	50	6.3
DEC	14.84	.48	1.39	.21	-	-
TOTAL	131.88	-	-	-	8676	-
AVERAGE	-	.36	-	-	-	11.4

* During period in which chlorination was practised

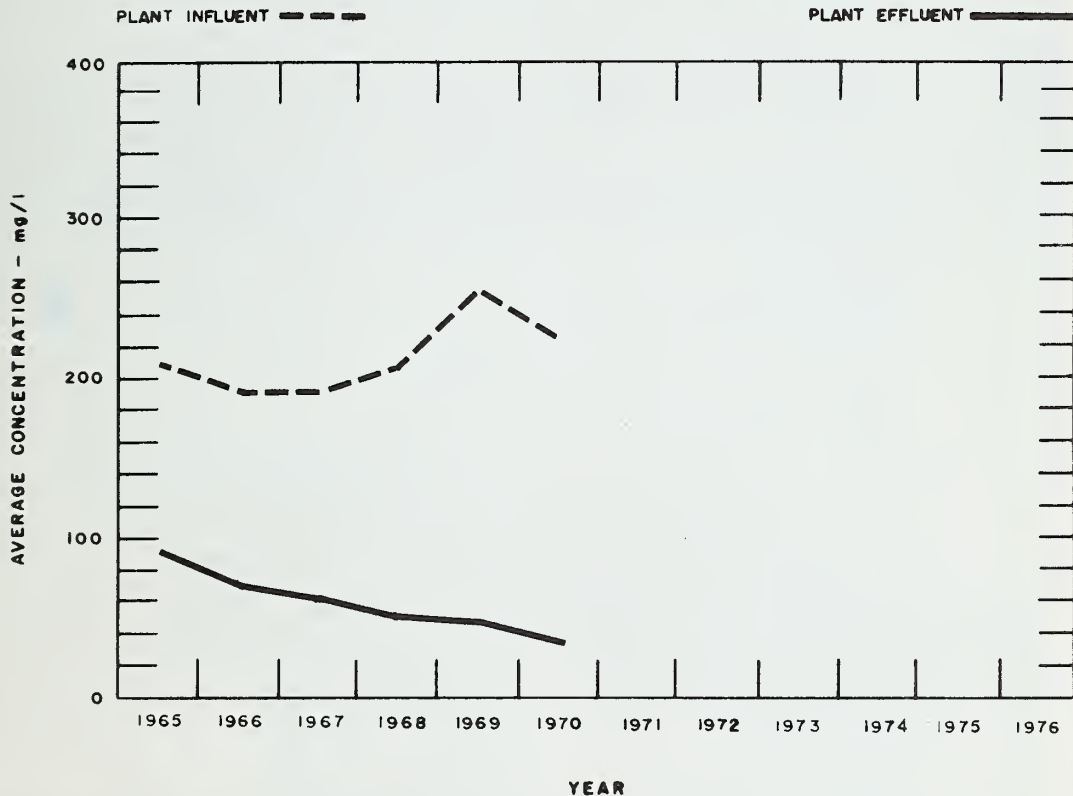


BIOCHEMICAL OXYGEN DEMAND





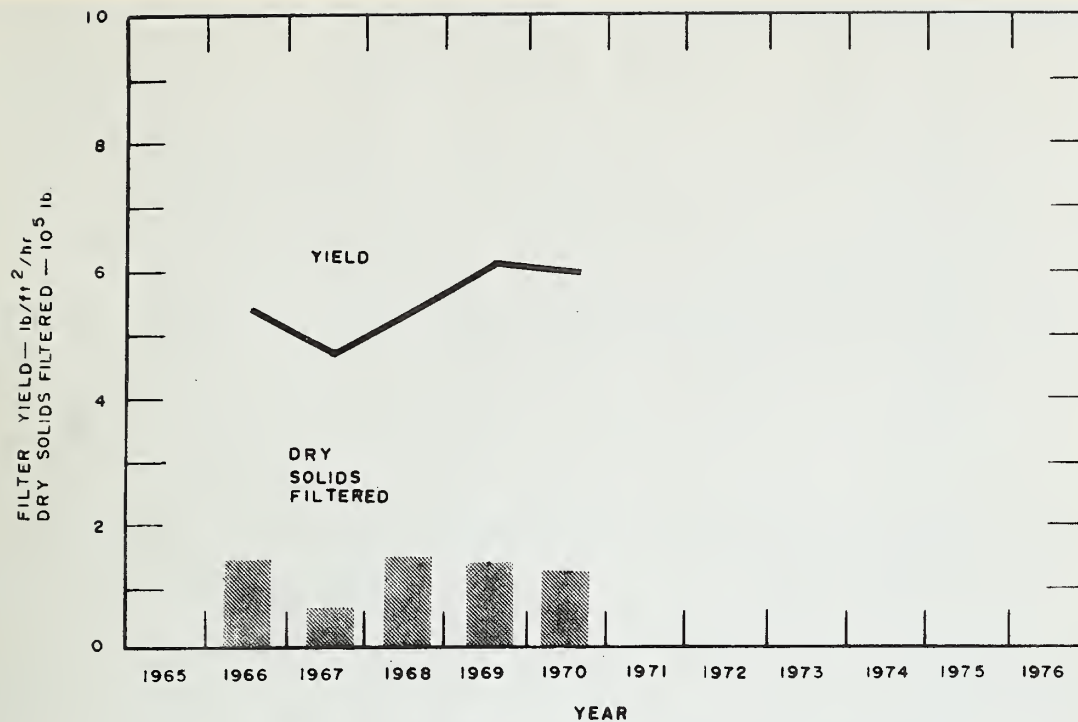
SUSPENDED SOLIDS



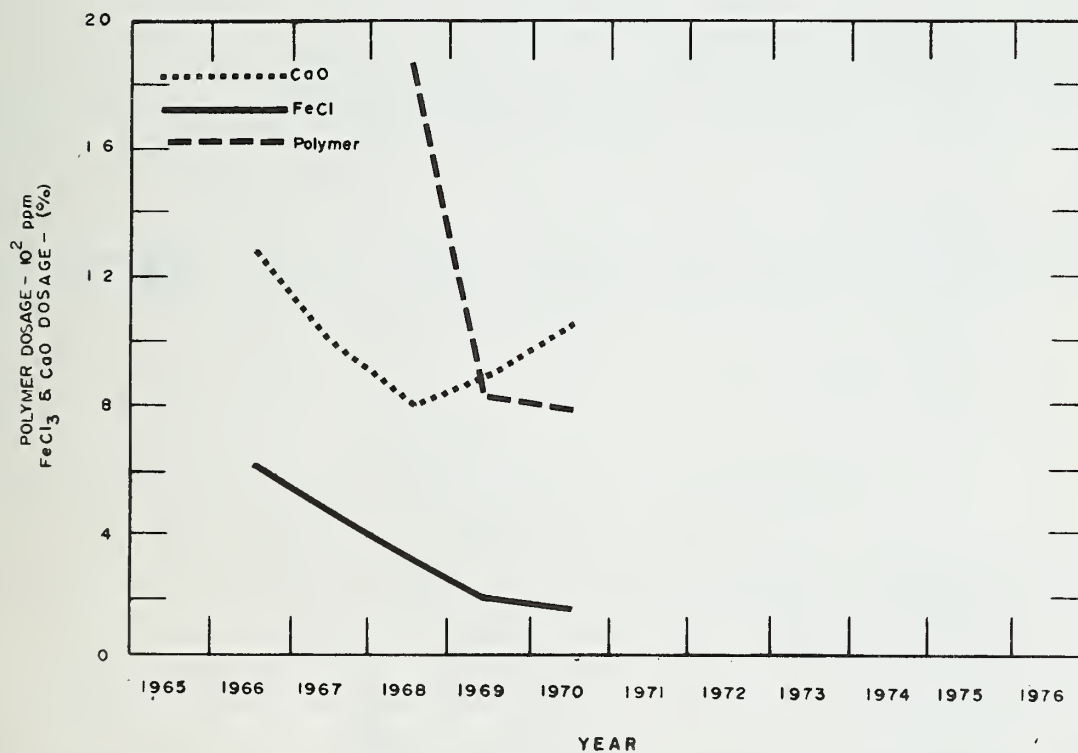
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED cu ft
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10 ³ pounds	n	mg/l	n	mg/l	%	10 ³ pounds	
JAN	2	82	2	40	51	3.1	6	140	6	24	83	8.5	0
FEB	2	147	2	33	78	9.9	5	326	5	23	93	26.3	71
MAR	2	95	2	38	60	7.0	6	117	6	29	75	10.8	0
APR	2	160	2	55	66	13.8	7	150	7	27	81	15.9	63
MAY	2	180	2	75	58	9.4	6	177	6	32	82	13.0	0
JUNE	2	175	2	65	63	8.9	6	246	6	36	85	17.0	70
JULY	2	175	2	92	47	8.3	7	277	7	36	87	24.1	45
AUG	2	210	2	87	59	10.9	6	271	6	33	89	21.2	0
SEPT	2	350	2	163	54	19.9	6	413	6	79	81	38.3	0
OCT	2	180	2	62	67	14.7	7	253	7	58	77	24.4	189
NOV	2	122	2	40	67	13.5	6	180	6	30	83	24.8	21
DEC	2	90	2	31	66	8.8	7	159	7	31	81	19.0	21
TOTAL	24	-	24	-	-	128.2	75	-	75	-	-	243.3	480
AVERAGE	-	164	-	65	60	10.7	-	224	-	37	84	20.3	-

NOTE - n is the number of samples taken



VACUUM FILTRATION



VACUUM FILTRATION

MONTH	TOTAL FILTER USE hr	SLUDGE		CONDITIONING CHEMICALS						FILTER CAKE % TS	FILTR. % TS	YIELD lb/hr sq ft
		TOTAL SOLIDS %	DRY SOLIDS 10 ³ lb	CaO		FeCl ₃		POLYMER				
				USED lb	DOSE %	USED lb	DOSE %	USED lb	DOSE ppm			
JAN	6	10.6	9.0	-	-	-	-	6.0	670	30	0.4	6.9
FEB	10	9.0	12.4	-	-	-	-	7.0	560	28	0.8	5.9
MAR	9	6.5	8.7	-	-	-	-	4.5	520	20	0.6	4.8
APR	5	8.7	8.1	-	-	-	-	3.0	370	28	0.3	8.1
MAY	8	6.4	10.6	-	-	-	-	8.0	750	27	0.3	6.2
JUNE	15	6.1	17.0	-	-	-	-	17.0	1000	27	0.3	5.4
JULY	6	10.0	11.1	-	-	-	-	8.0	720	25	0.8	8.5
AUG	10	9.6	16.2	280	6.8	130	3.1	16.0	1310	27	-	8.5
SEPT	18	7.5	16.9	1855	11.0	315	1.9	-	-	29	1.0	4.6
OCT	-	-	-	-	-	-	-	-	-	-	-	-
NOV	7	8.3	6.8	910	13.5	143	2.1	-	-	29	0.9	5.1
DEC	10	8.1	7.8	840	10.8	143	1.8	-	-	33	0.2	3.8
TOTAL	104	-	124.6	3885	-	731	-	69.5	-	-	-	-
AVERAGE	9	8.2	10.4	-	10.5	-	2.2	-	740	28	0.6	6.0

Date Due

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